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रबड़ एवं जालकों के प्रतीक

( दूसरा पुनरीक्षण )

**Symbols for Rubbers and Latices**  
( Second Revision )

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## FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standard, after the draft finalized by the Rubber Sectional Committee had been approved by the petroleum, Coal and Related Products Division Council.

This standard was originally published in 1972 and subsequently revised in 1988. In this revision, some new symbols have been added and all symbols prescribed in this standard, have been updated in accordance with the latest international practice. Thermoplastic elastomers have been removed from this standard as IS 17138 exist for the same.

The objective of this standard is to provide standardized symbols for basic rubbers both in dry and latex forms for use in industry, trade and government. The standard is not intended to supplement existing trade names/trademarks. It's indeed intended to act as supplement and also to practice global nomenclature.

NOTE — In technical papers or presentations, technical name of the polymers should be used, if possible. These symbols/nomenclatures can follow the chemical names for use in later references.

In the preparation of this standard considerable assistance has been derived from following standards:

ISO 1629-2013(E) Rubber and latices — Nomenclature

ISO 18064 : 2014 Thermoplastic elastomers — Nomenclature and abbreviated terms

ASTM D1418-17 Standard Practice for Rubber and Rubber Latices — Nomenclature

The composition of the Committee responsible for the formulation of this standard is given at Annex A.

*Indian Standard*

# SYMBOLS FOR RUBBERS AND LATICES

*( Second Revision )*

## 1 SCOPE

This standard gives a general classification for the basic rubbers both in dry and latex form, based on the chemical composition of the polymer chain.

## 2 CLASSIFICATION

Rubbers, in both dry and latex forms, are classified/ coded in following manner:

- M** Rubbers having a saturated chain of the polymethylene type
- N** Rubbers having nitrogen in the polymer chain
- O** Rubbers having carbon and oxygen in the polymer chain
- Q** Rubbers having silicon and oxygen in the polymer chain
- R** Rubbers having an unsaturated carbon chain, for example, natural rubber and synthetics rubbers derived at least partly from conjugated dienes
- T** Rubbers having carbon, sulphur, and oxygen in the polymers chain
- U** Rubbers having carbon, oxygen and nitrogen in the polymer chain
- Z** Rubber having phosphorous and nitrogen in the polymers chain

## 3 GROUP DESIGNATIONS

### 3.1 The "M" group

The "M" group comprises of rubbers having a saturated chain of the polymethylene type. The following classification is used:

- ACM** copolymer of ethyl acrylate (or other acrylates) and a small amount of a monomer which facilitates vulcanization (usually known as acrylic rubber)
- AEM** copolymer of ethyl acrylate (or other acrylates) and ethylene

<b>ANM</b>	copolymer of ethyl acrylate (or other acrylates) and acrylonitrile
<b>BIMSM</b>	terpolymer of isobutene, para-methylstyrene, and para-bromomethylstyrene
<b>CM</b>	chloropolyethylene <sup>1</sup>
<b>CSM</b>	chlorosulfonylpolyethylene
<b>EBM</b>	ethylene-butene copolymer
<b>EOM</b>	ethylene-octene copolymer
<b>EPDM</b>	terpolymer of ethylene, propylene, and a diene with the residual unsaturated portion of the polymerized diene in the side chain
<b>EPM</b>	ethylene-propylene copolymer
<b>EVM</b>	ethylene-vinyl acetate copolymer <sup>2</sup>
<b>FEPM</b>	copolymer of tetrafluoroethylene and propylene
<b>FFKM</b>	perfluoro rubber in which all substituent groups on the polymer chain are fluoro, perfluoroalkyl, or perfluoroalkoxy groups
<b>FKM</b>	fluoro rubber having substituent fluoro, perfluoroalkyl, or perfluoroalkoxy groups on the polymer chain
<b>IM</b>	polyisobutene <sup>3</sup>
<b>NBM</b>	fully hydrogenated acrylonitrile-butadiene copolymer (see 3.4.1)
<b>SEBM</b>	styrene-ethylene-butene terpolymer
<b>SEPM</b>	styrene-ethylene-propylene terpolymer

### 3.2 The "O" group

The "O" group comprises of rubbers having carbon and oxygen in the polymer chain. The following classification is used:

- CO** polychloromethyloxirane (usually known as epichlorohydrin rubber)
- ECO** copolymer of ethylene oxide (oxirane) and chloromethyloxirane (also known as epichlorohydrin copolymer or rubber)

<sup>1</sup> In ISO 1043-1, the abbreviated term given for chloropolyethylene is PE-C.

<sup>2</sup> In ISO 1043-1, the abbreviated term given for ethylene-vinyl acetate copolymer is EVAC.

<sup>3</sup> In ISO 1043-1, the abbreviated term given for polyisobutene is PIB.

<b>GCO</b>	copolymer of epichlorohydrin and allyl glycidyl ether
<b>GECO</b>	terpolymer of epichlorohydrin-ethylene oxide-allyl glycidyl ether
<b>GPO</b>	copolymer of propylene oxide and allyl glycidyl ether (also known as polypropylene oxide rubber)

### 3.3 The “Q” group

The “Q” group, in both dry and latex forms, is defined by inserting the name of the substituent group on the polymer chain prior to the silicone designation. The following classification is used:

<b>FMQ</b>	silicone rubber having both methyl and fluorine substituent groups on the polymer chain
<b>FVMQ</b>	silicone rubber having methyl, vinyl, and fluorine substituent groups on the polymer chain
<b>MQ</b>	silicone rubber having only methyl substituent groups on the polymer chain, such as dimethyl polysiloxane
<b>PMQ</b>	silicone rubber having both methyl and phenyl substituent groups on the polymer chain
<b>PVMQ</b>	silicone rubber having methyl, vinyl, and phenyl substituent groups on the polymer chain
<b>VMQ</b>	silicone rubber having both methyl and vinyl substituent groups on the polymer chain

The letter for substituent group(s) on the polymer chain is inserted to the left of the code letter for rubber with silicon and oxygen in the backbone (Q) in descending order of percent present, that is, largest nearest the “Q”.

NOTE — In ISO 1043-1, [2] the symbol for silicone polymers is SI.

### 3.4 The “R” group

The “R” group, in both dry and latex forms, is defined by inserting, before the word “rubber”, the name of the monomer or monomers from which the rubber was prepared (except for natural rubber). The letter preceding the letter “R” signifies the conjugated diene from which the rubber was prepared (except for natural rubber). Any letter or letters preceding the diene letter signifies the comonomer or comonomers, substituent groups, or chemical modifications. The designation may be prefixed by the letter “E” and a hyphen to signify an emulsion polymerized rubber or the letter “S” and a hyphen to signify a solution polymerized rubber.

For latices the designated symbol is followed by the word latex, for example, “SBR latex”.

The classification provided in 3.4.1 to 3.4.3 are used.

#### 3.4.1 General

<b>ABR</b>	acrylate-butadiene rubber
<b>BR</b>	butadiene rubber
<b>CR</b>	chloroprene rubber
<b>DPNR</b>	deproteinized natural rubber
<b>ENR</b>	epoxidized natural rubber
<b>HNBR</b>	hydrogenated NBR (some unsaturation remains, <i>see</i> 3.1)
<b>IIR</b>	isobutene-isoprene rubber (usually known as butyl rubber)
<b>IR</b>	isoprene rubber, synthetic
<b>MSBR</b>	$\alpha$ -methylstyrene-butadiene rubber
<b>NBIR</b>	acrylonitrile-butadiene-isoprene rubber
<b>NBR</b>	acrylonitrile-butadiene rubber (usually known as nitrile rubber)
<b>NIR</b>	acrylonitrile-isoprene rubber
<b>NOR</b>	norbornene rubber
<b>NR</b>	natural rubber
<b>PBR</b>	vinylpyridine-butadiene rubber
<b>PSBR</b>	vinylpyridine-styrene-butadiene rubber
<b>SBR</b>	styrene-butadiene rubber
<b>E-SBR</b>	emulsion-polymerized SBR
<b>S-SBR</b>	solution-polymerized SBR
<b>SIBR</b>	styrene-isoprene-butadiene rubber

#### 3.4.2 Rubbers having Substituent Carboxylic Acid Groups (COOH) on the Polymer Chain

<b>XBR</b>	carboxylic-butadiene rubber
<b>XCR</b>	carboxylic-chloroprene rubber
<b>XNBR</b>	carboxylic-acrylonitrile-butadiene rubber
<b>XSBR</b>	carboxylic-styrene-butadiene rubber

#### 3.4.3 Rubbers Containing Halogen on the Polymer Chain

<b>BIIR</b>	bromo-isobutene-isoprene rubber (usually known as bromobutyl rubber)
<b>CIIR</b>	chloro-isobutene-isoprene rubber (usually known as chlorobutyl rubber)

### 3.5 The “T” Group

The “T” group comprises of rubbers having carbon, oxygen, and sulfur in the polymer chain. They are usually known as polysulfide rubbers. The following classification is used:

**OT** a rubber having either a  $-\text{CH}_2-$   
 $\text{CH}_2-\text{O}-\text{CH}_2-\text{O}-\text{CH}_2-\text{CH}_2-$  group or occasionally an “R” group, where “R” is an aliphatic hydrocarbon, not usually  $-\text{CH}_2-\text{CH}_2-$ , between the polysulfide linkages in the polymer chain

**EOT** a rubber having a  $-\text{CH}_2-\text{CH}_2-\text{O}-$   
 $\text{CH}_2-\text{O}-\text{CH}_2-\text{CH}_2-$  group and “R” groups which are usually  $-\text{CH}_2-\text{CH}_2-$  but occasionally other aliphatic groups between the polysulfide linkages in the polymer chain

### 3.6 The “U” Group

The “U” group comprises of rubbers having carbon, oxygen, and nitrogen in the polymer chain. The

following classification is used:

**AFMU** terpolymer of tetrafluoroethylene, trifluoro-nitrosomethane, and nitrosoperfluorobutyric acid

**AU** polyester urethane

**EU** polyether urethane

### 3.7 The “Z” Group

The “Z” group comprises rubbers having phosphorus and nitrogen in the polymer chain. The following classification is used:

**FZ** a rubber having a  $-\text{P}=\text{N}-$  chain and having fluoroalkoxy groups attached to the phosphorus atoms in the chain

**PZ** a rubber having a  $-\text{P}=\text{N}-$  chain and having aryloxy (phenoxy and substituted phenoxy) groups attached to the phosphorus atoms in the chain

## ANNEX A

( *Foreword* )

### COMMITTEE COMPOSITION

Rubber and Rubber Products Sectional Committee, PCD 13

<i>Organization</i>	<i>Representative(s)</i>
The Rubber Board, Kottayam	DR JAMES JACOB DR SIBY VARGHESE ( <i>Alternate</i> )
Dow Corning India Pvt Ltd, Mumbai	SHRI SUBHRANSHU GUPTA
Export Inspection Council of India, New Delhi	SHRI K. J. SRIVASTAV
Flame Retardants Association of India, Gurgaon	SHRI P. V. MURALI MOHAN
GRP Limited, 510, 'A' Wing, Kohinoor City Commercial – 1, Kirol Road, off L.B.S. Marg, Landmark-Opp Don Bosco School Kurla (West), Mumbai Maharashtra	SHRI KALYAN DAS
Hasetri, Jayagram PO: Tyre Factory Dist Rajsamand, Kankroli 313342, Rajasthan	SHRI SAIKAT DAS GUPTA
Hindustan Latex Limited Lifecare Limited, Thiruvananthapuram	DR A. G. SHANKARAN
In Personal Capacity	DR ARUP K. CHANDRA
In Personal Capacity	DR SUNNY SEBASTIAN DR BHARAT KAPGATE ( <i>Alternate</i> )
Indian Rubber Mfrs Research Association, Mumbai	DR K RAJ KUMAR
IRMRA	SHRI PRAVEEN MATHEW (DIRECTOR) SHRI K. K. THAKUR ( <i>Alternate</i> )
KA Pre Vulcanized, Tamil Nadu	SHRI A. KRISHNA KUTTY
LPG Equipment Research Centre, Bengaluru	SHRI S. K. SAXENA
Ministry of Defence (DGQA), New Delhi	SHRI V. K. CHHABRA ( <i>Alternate</i> )
Personal Capacity	DR RANJIT MATHHAN
All India Rubber Industries Association, Mumbai	MR SRIKANTH KRISHNAMURTHY SHRI CHINMOY RAY ( <i>Alternate</i> )
Association of Planters Kerala	SANTOSH KUMAR SHRI PHILIP C. JACOB ( <i>Alternate</i> )
Automotive Tyres Manufacturers Association (ATMA), New Delhi	MR RAJIV BUDHRAJA MR VINAY VIJAYVARGIA ( <i>Alternate</i> )
Block Rubber Processor's Association of India, Kottayam Kerala	SHRI RAJIV THARIAN SHRI RONNY JOSEPH ( <i>Alternate</i> )
Indian Oil Corporation R&D Centre – Faridabad – Haryana	DR DEEPAK SAXENA DR PANKAJ BHATNAGAR ( <i>Alternate</i> )
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MRF Tyres, Chennai	MR B. JAYAMANI MR G. SHYJU ( <i>Alternate</i> )
Newage Fire Protection Industries Pvt Ltd	SHRI BHARAT J. SHAH SHRI JAYANT SINHA ( <i>Alternate</i> )
Rado Industries Limited, Faridabad	SHRI P. C. GUPTA SHRI KAILASH GUPTA ( <i>Alternate</i> )

<i>Organization</i>	<i>Representative(s)</i>
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Research, Designs & Standards Organization, Lucknow	SHRI MNJESH KUMAR SHRI RAVI PRAKASH ( <i>Alternate</i> )
Shri Sati Rubber Industries, Jaipur	SHRI VIJAY KUMAR AGARWAL SHRI SUDHIR AGARWAL ( <i>Alternate</i> )
Voluntary Organization in Interest of Consumer Education (Voice), New Delhi	SHRI M. A. U. KHAN SHRI H. WADHWA ( <i>Alternate</i> )
BIS Directorate General	SHRI V. K. DIUNDI, SCIENTIST 'G' AND HEAD (PCD) [ REPRESENTING DIRECTOR GENERAL ( <i>Ex-officio</i> ) ]

*Member Secretary*

SHRI CHANDRAKESH SINGH  
SCIENTIST 'C' (BIS)





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This Indian Standard has been developed from Doc No.: PCD 13 (14002).

## Amendments Issued Since Publication

<b>Amend No.</b>	<b>Date of Issue</b>	<b>Text Affected</b>

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